4. Natural Gas Statistics

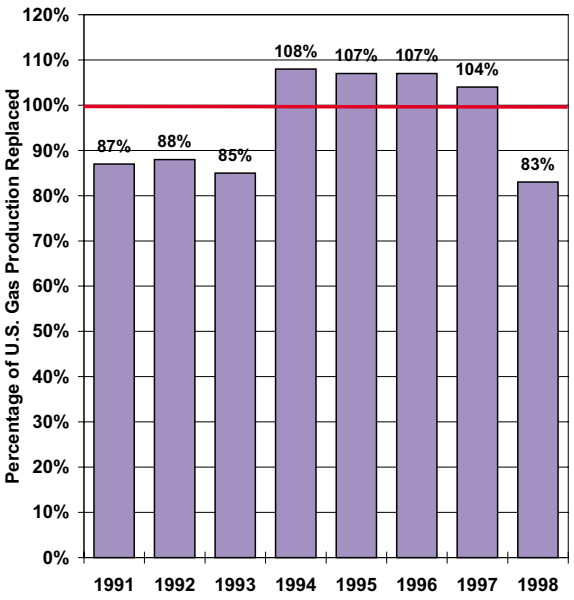
Dry Natural Gas

Proved Reserves

The Nation's 1998 proved reserves of dry natural gas were 164,041 billion cubic feet, 2 percent (3,182 billion cubic feet) less than in 1997 (**Table 8**). The four-year increasing trend for U.S. dry natural gas proved reserves came to an end in 1998.

Additions to dry gas reserves in 1998 were down 22 percent compared to 1997 (19,960 billion cubic feet) and replaced only 83 percent of gas production (**Figure 18**). Upward revisions of gas reserves in Colorado and Utah were outweighed by declines in reserves in other gas-producing States. U.S. *total discoveries* of dry natural gas reserves were 11,433 billion cubic feet in 1998, down 27 percent from 1997 (15,648 billion cubic feet). All components of *total discoveries* for gas (extensions, new field discoveries, and new reservoir discoveries in old fields) were down in 1998 compared to 1997.

Figure 18. Reserve Additions Replace only 83% of 1998 U.S. Dry Natural Gas Production.



Source: Energy Information Administration, Office of Oil and Gas.

Proved reserves by State are shown on the map in **Figure 19**. Seven areas account for 76 percent of the Nation's dry natural gas proved reserves:

Area	Percent of U.S. Gas Reserves
Texas	23
Gulf of Mexico Federal Offshore	16
New Mexico	9
Wyoming	8
Oklahoma	8
Alaska	6
Louisiana	6
Area Total	**76**

Of these seven areas, Wyoming and Oklahoma had increased reserves in 1998, while the other 5 had decreases in dry natural gas proved reserves.

Discussion of Reserves Changes

Figure 20 maps the change in dry gas proved reserves from 1997 to 1998 by area. Here's how the top seven areas fared, compared to the total United States:

Area	Change in U.S. Gas Reserves (billion cubic feet)
Texas	-177
Gulf of Mexico Federal Offshore	-1,500
New Mexico	-527
Wyoming	+88
Oklahoma	+206
Alaska	-635
Louisiana	-526
Area Total	**-3,071**
U.S. Total	**-3,182**

Figure 4 in Chapter 2 shows the components of the changes in dry natural gas proved reserves for 1998 and the preceding 10 years.

Revisions and Adjustments

Revisions and adjustments declined to 4,105 billion cubic feet in 1998, down 5 percent compared to 1997's level (4,312 billion cubic feet). Colorado had the largest increase in *revisions and adjustments* (1,368 billion cubic

Table 8. Dry Natural Gas Proved Reserves, Reserves Changes, and Production, 1998

(Billion Cubic Feet at 14.73 psia and 60° Fahrenheit)

State and Subdivision	Published Proved Reserves 12/31/97	Changes in Reserves During 1998							Proved Reserves 12/31/98
		Adjustments (+,-)	Revision Increases (+)	Revision Decreases (-)	Extensions (+)	New Field Discoveries (+)	New Reservoir Discoveries in Old Fields (+)	Estimated Production (-)	
Alaska	10,562	-172	169	125	2	4	0	513	9,927
Lower 48 States	**156,661**	**-1,463**	**27,834**	**22,138**	**8,195**	**1,070**	**2,162**	**18,207**	**154,114**
Alabama	4,968	5	309	313	19	10	0	394	4,604
Arkansas	1,475	-1	596	653	45	0	36	170	1,328
California	2,273	-88	574	328	47	0	12	246	2,244
Coastal Region Onshore	164	-42	44	48	0	0	0	12	106
Los Angeles Basin Onshore	141	-10	39	24	1	0	11	9	149
San Joaquin Basin Onshore	1,912	-44	491	244	46	0	1	217	1,945
State Offshore	56	8	0	12	0	0	0	8	44
Colorado	6,828	-93	1,898	437	361	0	0	676	7,881
Florida	96	-3	0	0	0	0	0	5	88
Kansas	6,989	-265	501	300	23	1	1	548	6,402
Kentucky	1,364	-93	14	41	20	0	21	63	1,222
Louisiana	9,673	-261	2,173	2,034	631	57	311	1,403	9,147
North	3,093	-31	833	725	128	0	0	400	2,898
South Onshore	5,855	-145	1,243	1,199	498	45	276	875	5,698
State Offshore	725	-85	97	110	5	12	35	128	551
Michigan	2,195	105	538	288	12	6	0	240	2,328
Mississippi	582	-19	177	112	109	0	0	79	658
Montana	762	-12	119	43	6	1	0	51	782
New Mexico	15,514	-48	2,040	1,882	805	1	6	1,449	14,987
East	2,642	12	623	439	275	1	6	427	2,693
West	12,872	-60	1,417	1,443	530	0	0	1,022	12,294
New York	224	-26	18	7	0	0	25	16	218
North Dakota	479	-31	47	27	25	0	0	46	447
Ohio	985	-179	276	118	1	0	19	94	890
Oklahoma	13,439	106	2,995	1,997	600	4	42	1,544	13,645
Pennsylvania	1,852	-9	218	114	19	1	4	131	1,840
Texas	37,761	-712	7,584	6,334	3,365	249	526	4,855	37,584
RRC District 1	953	138	174	168	108	7	5	113	1,104
RRC District 2 Onshore	1,634	-97	231	257	184	3	135	219	1,614
RRC District 3 Onshore	4,172	-250	1,079	773	378	43	93	781	3,961
RRC District 4 Onshore	8,099	-353	1,601	1,562	1,705	43	219	1,323	8,429
RRC District 5	1,710	29	689	557	276	17	13	224	1,953
RRC District 6	5,887	-78	1,439	1,019	313	1	0	594	5,949
RRC District 7B	478	-47	28	81	0	124	0	60	442
RRC District 7C	3,407	-108	401	304	70	3	0	356	3,113
RRC District 8	5,397	-133	767	790	121	5	31	541	4,857
RRC District 8A	847	29	100	106	3	0	0	66	807
RRC District 9	794	-5	100	80	26	0	0	101	734
RRC District 10	4,094	141	834	560	179	3	0	418	4,273
State Offshore	289	22	141	77	2	0	30	59	348
Utah	1,839	97	645	110	133	0	0	216	2,388
Virginia	2,446	-495	111	79	45	0	6	61	1,973
West Virginia	2,846	-11	297	180	15	0	71	170	2,868
Wyoming	13,562	-76	1,918	1,774	839	7	12	838	13,650
Federal Offshore[a]	28,466	663	4,770	4,966	1,075	733	1,070	4,909	26,902
Pacific (California)	544	-10	19	43	1	0	6	37	480
Gulf of Mexico (Louisiana)[a]	21,934	598	3,193	3,543	847	583	890	3,728	20,774
Gulf of Mexico (Texas)	5,988	75	1,558	1,380	227	150	174	1,144	5,648
Miscellaneous[b]	43	-17	16	1	0	0	0	3	38
U.S. Total	**167,223**	**-1,635**	**28,003**	**22,263**	**8,197**	**1,074**	**2,162**	**18,720**	**164,041**

[a]Includes Federal offshore Alabama.

[b]Includes Arizona, Illinois, Indiana, Maryland, Missouri, Nebraska, Nevada, Oregon, South Dakota, and Tennessee.

[c]Indicates the estimate is associated with a sampling error (95 percent confidence interval) that exceeds 20 percent of the estimated value.

Note: The production estimates in this table are based on data reported on Form EIA-23, "Annual Survey of Domestic Oil and Gas Reserves," and Form EIA-64A, "Annual Report of the Origin of Natural Gas Liquids Production." They may differ from the official Energy Information Administration production data for natural gas for 1998 contained in the *Natural Gas Annual 1998*, DOE/EIA-0131(98).

Source: Energy Information Administration, Office of Oil and Gas.

Figure 19. 1998 Dry Natural Gas Proved Reserves by Area

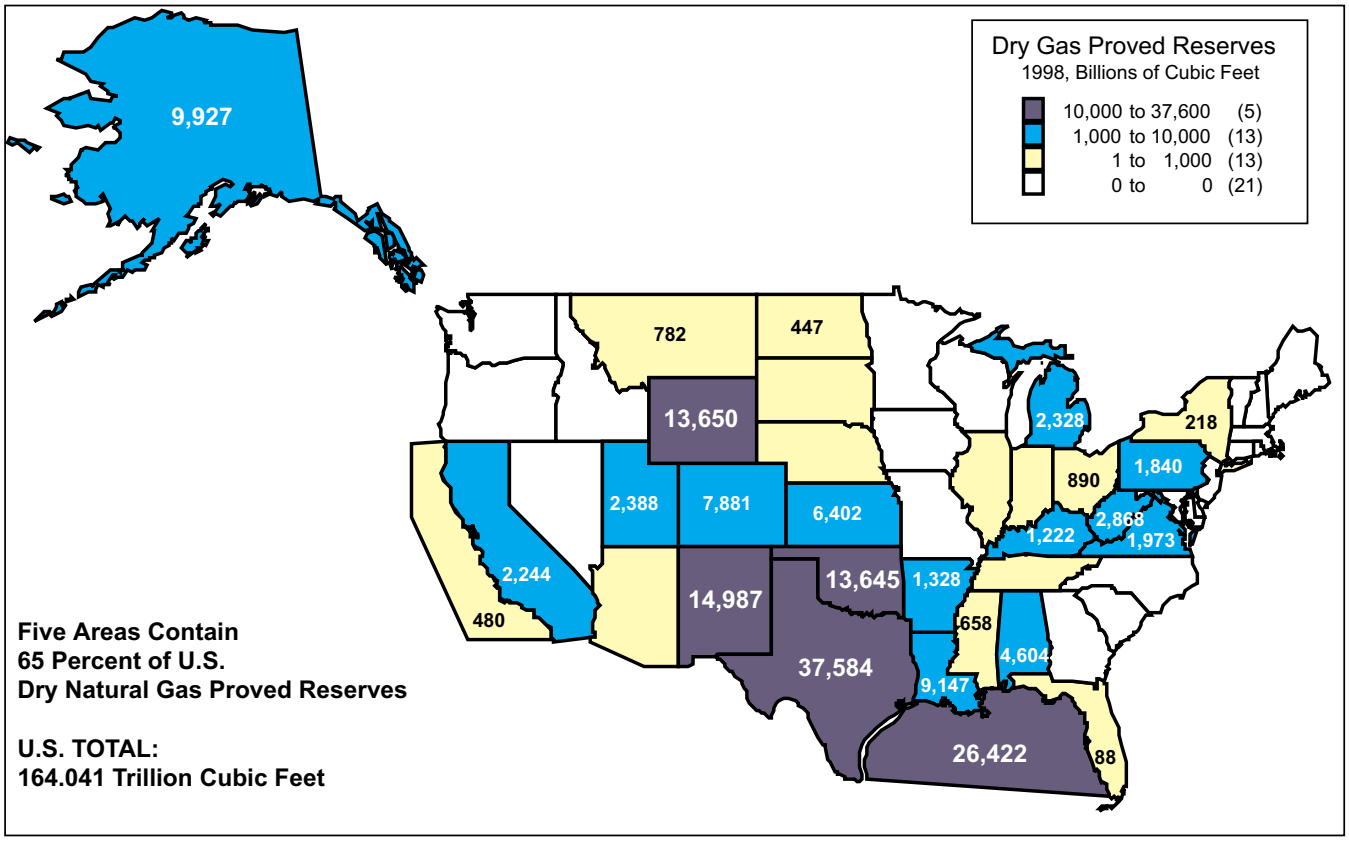
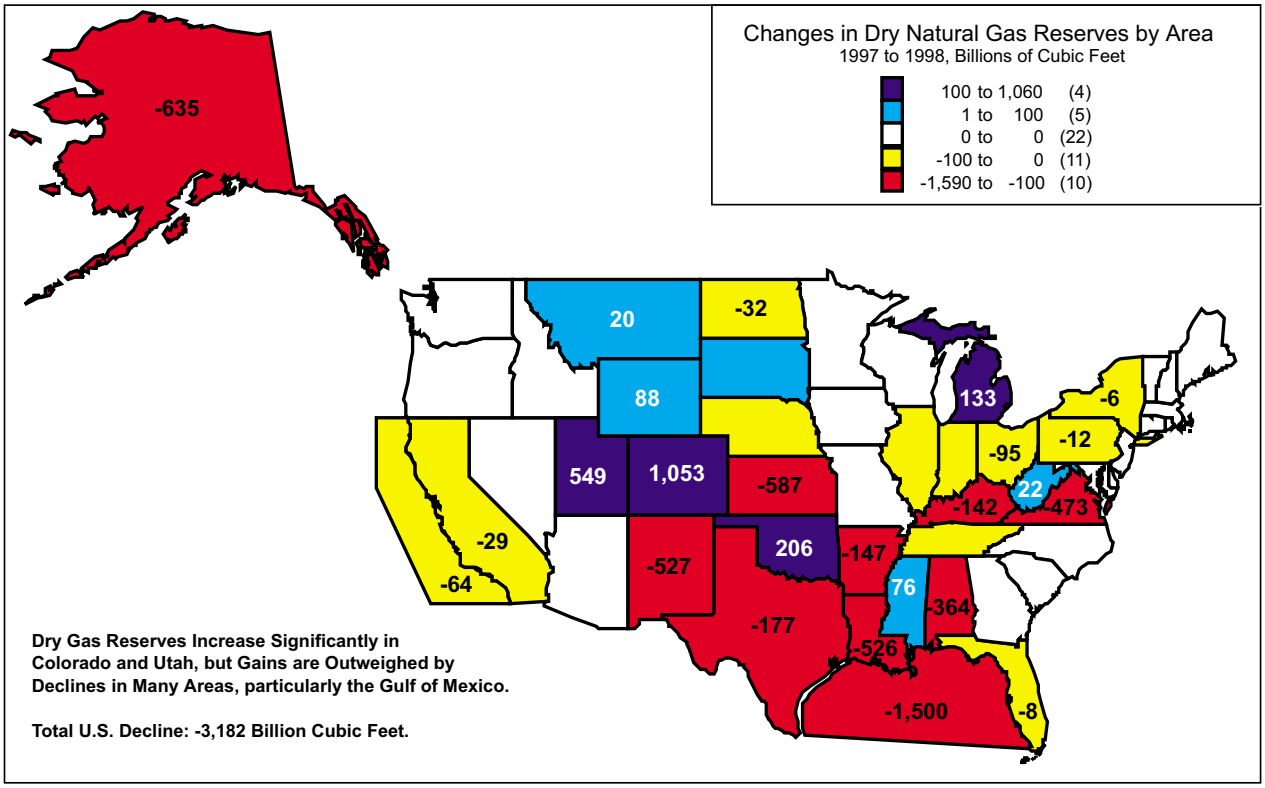


Figure 20. Changes in Dry Natural Gas Proved Reserves by Area, 1997 to 1998



Source: Energy Information Administration, Office of Oil and Gas.

feet). Oklahoma had the second largest with 1,104 billion cubic feet of net revisions and adjustments.

Discoveries

Total discoveries are those reserves attributable to field *extensions*, *new field discoveries*, and *new reservoir discoveries in old fields*; they result from drilling exploratory wells. *Total discoveries* of dry natural gas reserves were 11,433 billion cubic feet in 1998, a 27 percent decrease from the level reported in 1997 and equivalent to 61 percent of 1998 gas production. About 61 percent of the *total discoveries* were in the Gulf of Mexico Federal Offshore and Texas.

Extensions were 8,197 billion cubic feet, 23 percent lower than in 1997. Areas with the largest *extensions* and their percentage of total *extensions* were:

- Texas (41 percent)
- Gulf of Mexico Federal Offshore (13 percent)
- New Mexico (10 percent)
- Wyoming (10 percent)
- Louisiana (8 percent)
- Oklahoma (7 percent).

In the prior 10 years, U.S. operators reported an average of 6,909 billion cubic feet of reserves from *extensions* per year. Reserves from *extensions* in 1998 were 19 percent higher than that average volume.

New field discoveries were only 1,074 billion cubic feet in 1998—60 percent lower than in 1997. Those areas with the largest *new field discoveries* were the Gulf of Mexico Federal Offshore (with 68 percent of the total) and Texas (23 percent). In the prior 10 years, U.S. operators reported an average of 1,518 billion cubic feet of reserves from *new field discoveries* per year. Reserves from *new field discoveries* in 1998 were 29 percent lower than that average.

New reservoir discoveries in old fields were 2,162 billion cubic feet, 9 percent lower than 1997. Among the areas with the largest *new reservoir discoveries in old fields* and their percentage of the total were:

- Gulf of Mexico Federal Offshore (49 percent)
- Texas (24 percent)
- Louisiana (14 percent).

In the prior 10 years, U.S. operators reported an average of 2,318 billion cubic feet of reserves from *new reservoirs discovered in old fields* per year. Reserves from *new reservoirs discovered in old fields* in 1998 were 7 percent lower than that average volume.

Production

Dry natural gas production decreased 3 percent in 1998 (**Table 8**). As in 1997, the Gulf of Mexico Federal Offshore and the State of Texas were the leading producers of dry natural gas in 1998, each with over one-fourth of the U.S. total. The next three States combined, Oklahoma (8 percent), New Mexico (8 percent), and Louisiana (7 percent), added almost another one-fourth of the production.

Wet Natural Gas

U. S. proved reserves of wet natural gas, as of December 31, 1998, were 172,443 billion cubic feet, a 2 percent decrease from the volume reported in 1997 (**Table 9**). At year-end 1998 proved wet natural gas reserves for the lower 48 States had decreased by 2 percent (2,648 billion cubic feet) compared to 1997, while those of Alaska had decreased by 6 percent (630 billion cubic feet).

The volumetric differences between the estimates reported in **Table 8** (dry) and **Table 9** (wet) result from the removal of natural gas liquids at natural gas processing plants. A discussion of the methodology used to generate wet and dry natural gas reserves tables in this report is found in Appendix F. All natural gas proved reserves data shown in this report exclude natural gas held in underground storage.

Nonassociated Natural Gas

Proved Reserves

Proved reserves of nonassociated (NA) natural gas, wet after lease separation, in the United States decreased by 1 percent (1,556 billion cubic feet) in 1998 to 141,783 billion cubic feet (**Table 10**). The lower 48 States' NA wet natural gas proved reserves decreased by 1 percent to a level of 139,015 billion cubic feet, while Alaska declined 6 percent to a level of 2,768 billion cubic feet of NA wet natural gas proved reserves in 1998. Those areas with the largest increases in NA wet natural gas reserves were Colorado, Utah, Texas RRC District 4 Onshore, Texas RRC District 5, and Michigan. There were large decreases in NA wet natural gas reserves in

Table 9. Natural Gas Proved Reserves, Reserves Changes, and Production, Wet After Lease Separation, 1998 (Billion Cubic Feet at 14.73 psia and 60° Fahrenheit)

State and Subdivision	Published Proved Reserves 12/31/97	Changes in Reserves During 1998							Proved Reserves 12/31/98		
		Adjustments (+,–)	Revision Increases (+)	Revision Decreases (–)	Extensions (+)	New Field Discoveries (+)	New Reservoir Discoveries in Old Fields (+)	Production (–)	Total Gas	Non-associated Gas	Associated Dissolved Gas
Alaska	10,673	-163	170	125	2	4	0	518	10,043	2,768	7,275
Lower 48 States	**165,048**	**-1,461**	**29,231**	**23,294**	**8,628**	**1,112**	**2,240**	**19,104**	**162,400**	**139,015**	**23,385**
Alabama	5,013	4	312	316	19	10	0	399	4,643	4,615	28
Arkansas	1,479	0	597	655	45	0	36	170	1,332	1,294	38
California	2,390	-117	598	345	48	0	13	255	2,332	453	1,879
Coastal Region Onshore	176	-40	49	54	0	0	0	13	118	2	116
Los Angeles Basin Onshore	146	-11	40	25	1	0	12	9	154	1	153
San Joaquin Basin Onshore	2,012	-74	509	254	47	0	1	225	2,016	445	1,571
State Offshore	56	8	0	12	0	0	0	8	44	5	39
Colorado	7,160	-162	2,006	461	366	0	0	701	8,208	7,436	772
Florida	112	0	0	0	0	0	0	6	106	0	106
Kansas	7,328	-120	537	322	24	1	2	588	6,862	6,802	60
Kentucky	1,429	-83	15	43	21	0	23	67	1,295	1,275	20
Louisiana	10,036	-287	2,250	2,105	656	59	326	1,455	9,480	8,569	911
North	3,156	-48	847	736	130	0	0	406	2,943	2,760	183
South Onshore	6,137	-159	1,302	1,255	521	47	289	916	5,966	5,336	630
State Offshore	743	-80	101	114	5	12	37	133	571	473	98
Michigan	2,256	100	552	294	12	6	0	246	2,386	2,158	228
Mississippi	583	-18	178	112	110	0	0	79	662	615	47
Montana	769	-12	120	44	6	1	0	51	789	737	52
New Mexico	16,700	77	2,200	2,067	896	1	7	1,555	16,259	14,816	1,443
East	3,008	-15	703	495	311	1	7	481	3,039	1,694	1,345
West	13,692	92	1,497	1,572	585	0	0	1,074	13,220	13,122	98
New York	224	-26	18	7	0	0	25	16	218	217	1
North Dakota	531	-29	52	30	28	0	0	51	501	240	261
Ohio	985	-178	276	118	1	0	19	95	890	548	342
Oklahoma	14,311	99	3,187	2,125	638	5	44	1,642	14,517	13,321	1,196
Pennsylvania	1,861	-11	219	115	20	1	4	131	1,848	1,769	79
Texas	41,108	-790	8,150	6,824	3,561	273	557	5,242	40,793	33,429	7,364
RRC District 1	1,018	120	181	175	113	7	5	117	1,152	1,101	51
RRC District 2 Onshore	1,732	-93	246	274	196	3	144	234	1,720	1,516	204
RRC District 3 Onshore	4,418	-256	1,145	820	402	45	100	829	4,205	3,275	930
RRC District 4 Onshore	8,483	-371	1,676	1,636	1,784	45	229	1,386	8,824	8,430	394
RRC District 5	1,749	26	704	568	282	17	13	228	1,995	1,906	89
RRC District 6	6,194	-73	1,517	1,074	331	1	1	626	6,271	5,691	580
RRC District 7B	559	-62	33	94	0	143	0	69	510	306	204
RRC District 7C	3,843	-139	450	341	79	4	0	400	3,496	2,939	557
RRC District 8	6,030	-15	875	902	137	5	35	618	5,547	2,727	2,820
RRC District 8A	1,247	-35	137	147	5	0	0	92	1,115	18	1,097
RRC District 9	932	-5	118	93	31	0	0	119	864	665	199
RRC District 10	4,613	90	926	622	199	3	0	465	4,744	4,510	234
State Offshore	290	23	142	78	2	0	30	59	350	345	5
Utah	2,005	29	674	117	139	0	0	228	2,502	2,293	209
Virginia	2,446	-495	111	79	45	0	6	61	1,973	1,973	0
West Virginia	2,946	-12	307	186	16	0	73	176	2,968	2,925	43
Wyoming	14,321	-104	2,006	1,869	880	7	13	883	14,371	13,577	794
Federal Offshore[a]	29,011	691	4,850	5,059	1,097	748	1,092	5,004	27,426	19,931	7,495
Pacific (California)	556	-12	19	44	1	0	6	37	489	52	437
Gulf of Mexico (Louisiana)[a]	22,428	637	3,265	3,629	868	598	911	3,817	21,261	15,427	5,834
Gulf of Mexico (Texas)	6,027	66	1,566	1,386	228	150	175	1,150	5,676	4,452	1,224
Miscellaneous	44	-17	16	1	0	0	0	3	39	22	17
U.S. Total	**175,721**	**-1,624**	**29,401**	**23,419**	**8,630**	**1,116**	**2,240**	**19,622**	**172,443**	**141,783**	**30,660**

[a]Includes Federal offshore Alabama.
[b]Includes Arizona, Illinois, Indiana, Maryland, Missouri, Nebraska, Nevada, Oregon, South Dakota, and Tennessee.
[c]Indicates the estimate is associated with a sampling error (95 percent confidence interval) that exceeds 20 percent of the estimated value.
Note: The production estimates in this table are based on data reported on Form EIA-23. They may differ from the official Energy Information Administration production data for natural gas for 1998 contained in the *Natural Gas Annual 1998,* DOE/EIA-0131(98).
Source: Energy Information Administration, Office of Oil and Gas.

Table 10. Nonassociated Natural Gas Proved Reserves, Reserves Changes, and Production, Wet After Lease Separation, 1998

(Billion Cubic Feet at 14.73 psia and 60° Fahrenheit)

State and Subdivision	Published Proved Reserves 12/31/97	Changes in Reserves During 1998							Proved Reserves 12/31/98
		Adjustments (+,-)	Revision Increases (+)	Revision Decreases (-)	Extensions (+)	New Field Discoveries (+)	New Reservoir Discoveries in Old Fields (+)	Estimated Production (-)	
Alaska	2,957	-14	105	77	1	0	0	204	2,768
Lower 48 States	**140,382**	**-904**	**24,291**	**19,405**	**7,902**	**1,009**	**2,022**	**16,282**	**139,015**
Alabama	4,983	1	301	308	19	10	0	391	4,615
Arkansas	1,423	3	582	638	45	0	36	157	1,294
California	570	-43	73	102	5	0	1	51	453
Coastal Region Onshore	47	-46	1	0	0	0	0	0	2
Los Angeles Basin Onshore	3	0	0	3	1	0	0	0	1
San Joaquin Basin Onshore	518	-1	72	99	4	0	1	50	445
State Offshore	2	4	0	0	0	0	0	1	5
Colorado	6,627	-159	1,658	404	361	0	0	647	7,436
Florida	0	0	0	0	0	0	0	0	0
Kansas	7,277	-118	509	313	21	1	2	577	6,802
Kentucky	1,403	-82	15	40	21	0	23	65	1,275
Louisiana	9,020	-278	1,868	1,718	621	43	298	1,285	8,569
North	2,869	-129	774	525	116	0	0	345	2,760
South Onshore	5,538	-91	1,010	1,094	500	36	264	827	5,336
State Offshore	613	-58	84	99	5	7	34	113	473
Michigan	1,975	94	506	218	10	6	0	215	2,158
Mississippi	532	-12	157	100	110	0	0	72	615
Montana	727	-13	106	37	0	0	0	46	737
New Mexico	15,280	57	1,824	1,818	809	1	2	1,339	14,816
East	1,694	-3	340	290	225	1	2	275	1,694
West	13,586	60	1,484	1,528	584	0	0	1,064	13,122
New York	223	-26	18	7	0	0	25	16	217
North Dakota	274	-17	10	10	0	0	0	17	240
Ohio	594	-164	221	78	1	0	16	42	548
Oklahoma	13,296	-27	2,808	1,899	603	5	41	1,506	13,321
Pennsylvania	1,769	-2	213	105	12	1	4	123	1,769
Texas	33,322	-739	6,783	5,672	3,337	268	526	4,396	33,429
RRC District 1	950	114	173	151	113	7	5	110	1,101
RRC District 2 Onshore	1,497	-72	220	257	191	3	144	210	1,516
RRC District 3 Onshore	3,539	-211	816	727	354	43	97	636	3,275
RRC District 4 Onshore	8,115	-357	1,584	1,616	1,734	45	229	1,304	8,430
RRC District 5	1,681	40	657	563	282	17	9	217	1,906
RRC District 6	5,616	-127	1,465	994	323	1	1	594	5,691
RRC District 7B	299	-35	14	69	0	143	0	46	306
RRC District 7C	3,247	-126	339	264	70	2	0	329	2,939
RRC District 8	2,886	-38	486	317	44	4	11	349	2,727
RRC District 8A	41	-28	16	3	0	0	0	8	18
RRC District 9	785	-4	34	84	29	0	0	95	665
RRC District 10	4,386	81	841	557	195	3	0	439	4,510
State Offshore	280	24	138	70	2	0	30	59	345
Utah	1,695	31	664	31	138	0	0	204	2,293
Virginia	1,923	28	111	79	45	0	6	61	1,973
West Virginia	2,887	-8	305	176	16	0	73	172	2,925
Wyoming	13,471	-133	1,930	1,739	832	1	8	793	13,577
Federal Offshore[a]	21,098	698	3,623	3,913	896	673	961	4,105	19,931
Pacific (California)	58	0	1	6	0	0	1	2	52
Gulf of Mexico (Louisiana)[a]	16,241	533	2,479	2,762	681	523	786	3,054	15,427
Gulf of Mexico (Texas)	4,799	165	1,143	1,145	215	150	174	1,049	4,452
Miscellaneous	13	5	6	0	0	0	0	2	22
U.S. Total	**143,339**	**-918**	**24,396**	**19,482**	**7,903**	**1,009**	**2,022**	**16,486**	**141,783**

[a]Includes Federal offshore Alabama.

[b]Includes Arizona, Illinois, Indiana, Maryland, Missouri, Nebraska, Nevada, Oregon, South Dakota, and Tennessee.

Note: The production estimates in this table are based on data reported on Form EIA-23, "Annual Survey of Domestic Oil and Gas Reserves." They may differ from the official Energy Information Administration production data for natural gas for 1998 contained in the *Natural Gas Annual 1998*, DOE/EIA-0131(98).

Source: Energy Information Administration, Office of Oil and Gas.

Table 11. Associated-Dissolved Natural Gas Proved Reserves, Reserves Changes, and Production, Wet After Lease Separation, 1998

(Billion Cubic Feet at 14.73 psia and 60° Fahrenheit)

State and Subdivision	Published Proved Reserves 12/31/97	Changes in Reserves During 1998							Proved Reserves 12/31/98
		Adjustments (+,-)	Revision Increases (+)	Revision Decreases (-)	Extensions (+)	New Field Discoveries (+)	New Reservoir Discoveries in Old Fields (+)	Estimated Production (-)	
Alaska	7,716	-149	65	48	1	4	0	314	7,275
Lower 48 States	**24,666**	**-557**	**4,940**	**3,889**	**726**	**103**	**218**	**2,822**	**23,385**
Alabama	30	3	11	8	0	0	0	8	28
Arkansas	56	-3	15	17	0	0	0	13	38
California	1,820	-74	525	243	43	0	12	204	1,879
Coastal Region Onshore	129	6	48	54	0	0	0	13	116
Los Angeles Basin Onshore	143	-11	40	22	0	0	12	9	153
San Joaquin Basin Onshore	1,494	-73	437	155	43	0	0	175	1,571
State Offshore	54	4	0	12	0	0	0	7	39
Colorado	533	-3	348	57	5	0	0	54	772
Florida	112	0	0	0	0	0	0	6	106
Kansas	51	-2	28	9	3	0	0	11	60
Kentucky	26	-1	0	3	0	0	0	2	20
Louisiana	1,016	-9	382	387	35	16	28	170	911
North	287	81	73	211	14	0	0	61	183
South Onshore	599	-68	292	161	21	11	25	89	630
State Offshore	130	-22	17	15	0	5	3	20	98
Michigan	281	6	46	76	2	0	0	31	228
Mississippi	51	-6	21	12	0	0	0	7	47
Montana	42	1	14	7	6	1	0	5	52
New Mexico	1,420	20	376	249	87	0	5	216	1,443
East	1,314	-12	363	205	86	0	5	206	1,345
West	106	32	13	44	1	0	0	10	98
New York	1	0	0	0	0	0	0	0	1
North Dakota	257	-12	42	20	28	0	0	34	261
Ohio	391	-14	55	40	0	0	3	53	342
Oklahoma	1,015	126	379	226	35	0	3	136	1,196
Pennsylvania	92	-9	6	10	8	0	0	8	79
Texas	7,786	-51	1,367	1,152	224	5	31	846	7,364
RRC District 1	68	6	8	24	0	0	0	7	51
RRC District 2 Onshore	235	-21	26	17	5	0	0	24	204
RRC District 3 Onshore	879	-45	329	93	48	2	3	193	930
RRC District 4 Onshore	368	-14	92	20	50	0	0	82	394
RRC District 5	68	-14	47	5	0	0	4	11	89
RC District 6	578	54	52	80	8	0	0	32	580
RRC District 7B	260	-27	19	25	0	0	0	23	204
RRC District 7C	596	-13	111	77	9	2	0	71	557
RRC District 8	3,144	23	389	585	93	1	24	269	2,820
RRC District 8A	1,206	-7	121	144	5	0	0	84	1,097
RRC District 9	147	-1	84	9	2	0	0	24	199
RRC District 10	227	9	85	65	4	0	0	26	234
State Offshore	10	-1	4	8	0	0	0	0	5
Utah	310	-2	10	86	1	0	0	24	209
Virginia	523	-523	0	0	0	0	0	0	0
West Virginia	59	-4	2	10	0	0	0	4	43
Wyoming	850	29	76	130	48	6	5	90	794
Federal Offshore[a]	7,913	-7	1,227	1,146	201	75	131	899	7,495
Pacific (California)	498	-12	18	38	1	0	5	35	437
Gulf of Mexico (Louisiana)[a]	6,187	104	786	867	187	75	125	763	5,834
Gulf of Mexico (Texas)	1,228	-99	423	241	13	0	1	101	1,224
Miscellaneous[b]	31	-22	10	1	0	0	0	1	17
U.S. Total	**32,382**	**-706**	**5,005**	**3,937**	**727**	**107**	**218**	**3,136**	**30,660**

[a] Includes Federal offshore Alabama.

[b] Includes Arizona, Illinois, Indiana, Maryland, Missouri, Nebraska, Nevada, Oregon, South Dakota, and Tennessee.

Note: The production estimates in this table are based on data reported on Form EIA-23, "Annual Survey of Domestic Oil and Gas Reserves." They may differ from the official Energy Information Administration production data for natural gas for 1998 contained in the *Natural Gas Annual 1998*, DOE/EIA-0131(98).

Source: Energy Information Administration, Office of Oil and Gas.

the Gulf of Mexico Federal Offshore, Kansas, New Mexico, Louisiana, and Alabama.

Discoveries

NA wet natural gas *total discoveries* of 10,934 billion cubic feet decreased 20 percent (2,784 billion cubic feet) in 1998. Texas, the Gulf of Mexico Federal Offshore, Louisiana, Wyoming, and New Mexico and accounted for 9,275 billion cubic feet or 85 percent of U.S. NA wet natural gas *total discoveries* in 1998.

Production

U.S. production of NA wet natural gas decreased by 4 percent (626 billion cubic feet) in 1998 (**Table 10**). The five leading producing areas, Texas, the Gulf of Mexico Federal Offshore, Oklahoma, New Mexico and Louisiana, all reported production declines in 1998. As in 1997, Texas (with 27 percent of 1998 U.S. NA gas production) and the Gulf of Mexico Federal Offshore (with 25 percent) were the leading producers of NA wet natural gas in 1998.

Associated-Dissolved Natural Gas

Proved Reserves

Proved reserves of associated-dissolved (AD) natural gas, wet after lease separation, in the United States decreased by 5 percent (1,722 billion cubic feet) to 30,660 billion cubic feet in 1998 (**Table 11**). Proved reserves of AD wet natural gas in the lower 48 States decreased by 5 percent (1,281 billion cubic feet) to 23,385 billion cubic feet, and Alaska declined 6 percent to 7,275 billion cubic feet in 1998. Those areas of the country with the largest AD wet natural gas reserves and their percentage of the total were:

- Texas (24 percent)
- Alaska (24 percent)
- Gulf of Mexico Federal Offshore (23 percent)
- California (6 percent)
- New Mexico (5 percent).

These areas logically correspond to the areas of the country with the largest volumes of crude oil reserves.

Production

U.S. production of AD wet natural gas increased by 4 percent in 1998 (**Table 11**), and production of AD wet natural gas in the lower 48 States increased by 3 percent (70 billion cubic feet). Those areas of the country with the largest AD wet natural gas production and their percentage of the total were:

- Gulf of Mexico Federal Offshore (28 percent)
- Texas (27 percent)
- Alaska (10 percent)
- New Mexico (7 percent)
- California (7 percent).

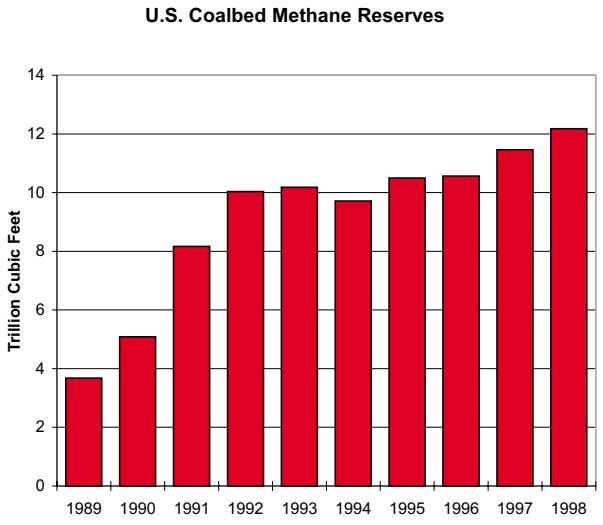
Again, these areas logically correspond to the areas of the country with the largest volumes of crude oil production.

Coalbed Methane

Proved Reserves

In 1998, reserves of coalbed methane increased 6 percent to 12,179 billion cubic feet from 1997's level (11,462 billion cubic feet), and now account for 7 percent of all 1998 dry natural gas reserves (**Table 12**). Federal tax incentives for new coalbed methane wells expired at the end of 1992. The EIA estimates that the 1998 proved gas reserves of fields identified as having

Figure 21. Coalbed Methane Proved Reserves 1989-1998



Source: Energy Information Administration, Office of Oil and Gas.

Table 12. U.S. Coalbed Methane Proved Reserves and Production, 1991-1998
(Billion Cubic Feet at 14.73 psia and 60° Fahrenheit)

Year	Alabama		Colorado		New Mexico		Others[a]		Total	
	Reserves	Production	Reserves	Production	Reserves	Production	Reserves	Production	Reserves	Production
1991	1,714	68	2,076	48	4,206	229	167	3	**8,163**	**348**
1992	1,968	89	2,716	82	4,724	358	626	10	**10,034**	**539**
1993	1,237	103	3,107	125	4,775	486	1,065	18	**10,184**	**752**
1994	976	108	2,913	179	4,137	530	1,686	34	**9,712**	**851**
1995	972	109	3,461	226	4,299	574	1,767	47	**10,499**	**956**
1996	823	98	3,711	274	4,180	575	1,852	56	**10,566**	**1,003**
1997	1,077	111	3,890	312	4,351	597	2,144	70	**11,462**	**1,090**
1998	1,029	123	4,211	401	4,232	571	2,707	99	**12,179**	**1,194**

[a]Includes Oklahoma, Pennsylvania, Utah, Virginia, West Virginia, and Wyoming.
Source: Energy Information Administration, Office of Oil and Gas.

coalbed methane are now more than triple the volume reported in 1989 (**Figure 21**). Coalbed methane proved reserves are principally located in New Mexico, Colorado, and Alabama. Estimates of proved coalbed methane reserves increased in Colorado and Alabama, but decreased slightly in New Mexico in 1998.

Production

Coalbed methane production grew by about 10 percent in 1998 to 1,194 billion cubic feet—about 6 percent of U.S. dry gas production. Most of the 1998 production increase (104 billion cubic feet) occurred in Colorado (the San Juan Basin).

Areas of Note: Large Discoveries and Reserves Additions

The following State or area discussions summarize notable activities during the year concerning expected new field reserves, development plans, and possible production rates as extracted from various trade publications and company reports. The citations do not necessarily reflect EIA's concurrence, but are considered important enough to be brought to the reader's attention.

Colorado

Colorado had a net increase of 1,053 billion cubic feet of dry natural gas proved reserves in 1998. The largest net gas reserves increase of all States in 1998, it was mostly from net revisions.

Development of existing fields in the Piceance and Denver - Julesburg Basins - mostly done through less expensive recompletions, rather than more expensive new wells—boosted the reserves additions for this State.

Utah

Utah had a net increase of 549 billion cubic feet of dry natural gas proved reserves in 1998. This was the result of development of large existing coalbed methane fields and gas fields within the Uinta Basin.

Texas

Although the State of Texas had a net decline in dry natural gas proved reserves in 1998, the largest volume of new discoveries in 1998 was nevertheless made there.

South Texas: As in 1997, operators remain active in the Lobo Trend in the lower Rio Grande Valley of south Texas (RRC District 4). The trend occurs primarily in Webb and Zapata counties and contains the four producing horizons, Wilcox, Expanded Wilcox, Frio, and Lobo. Unlike some other parts of the country, one or two fields do not dominate the area. RRC District 4 increased its dry natural gas reserves by 330 billion cubic feet in 1998. Operators in RRC District 4 reported more *extensions* (51 percent of the State total) than any other district in Texas. This district accounts for 22 percent of all of the reserves of dry natural gas in the State and leads the State in gas production (27 percent of the State total). RRC District 4's dry gas production increased 2 percent in 1998.

Similarly, RRC District 5 had an increase in dry natural gas reserves of 243 billion cubic feet in 1998—mostly from *extensions* of existing gas fields and *revisions*. RRC District 5's dry gas production increased 2 percent in 1998.

Oklahoma

Oklahoma had a net increase of 206 billion cubic feet of dry natural gas proved reserves in 1998. It was third overall in State total dry gas reserves additions. About two-thirds of Oklahoma's gain was from net revisions and adjustments of existing fields, but a large volume of reported extensions also boosted Oklahoma's total in 1998.

Areas of Note: Large Reserves Declines

The following areas had large declines in dry natural gas proved reserves due to downward revisions or unreplaced production.

Gulf of Mexico Federal Offshore

This area's proved dry natural gas reserves decreased by 5 percent (1,500 billion cubic feet) in 1998. Dry gas production from the Gulf of Mexico Federal Offshore declined by 5 percent (261 billion cubic feet) from 1997 to 1998.

Alaska

This State's proved dry natural gas reserves decreased by 6 percent (635 billion cubic feet) in 1998.

Kansas

This State's proved dry natural gas reserves decreased by 8 percent (587 billion cubic feet) in 1998.

New Mexico

This State's proved dry natural gas reserves decreased by 3 percent (527 billion cubic feet) in 1998.

Reserves in Nonproducing Reservoirs

Nonproducing proved natural gas reserves (wet after lease separation) of 36,047 billion cubic feet were reported in 1998 (**Appendix D, Table D10**). This was 9 percent (2,923 billion cubic feet) more gas than in 1997. About 33 percent of the reserves in nonproducing reservoirs are located in the Gulf of Mexico Federal Offshore area. Much of the new deepwater reserves are in the nonproducing category. Wells or reservoirs are nonproducing due to any of several operational reasons. These include:

- waiting for well workovers
- waiting for additional development or replacement wells to be drilled
- production or pipeline facilities not yet installed
- awaiting depletion of other zones or reservoirs before recompletion in reservoirs not currently open to production (called "behind pipe" reserves).